

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Amended): A printed circuit board constituted by alternately laminating interlayer resin insulating layers and conductive circuits on a core substrate containing a capacitor, an IC chip ~~[[is]]~~ being mounted on an outer layer thereof, characterized in that the core substrate containing said capacitor is constituted by providing a first resin substrate, a second resin substrate having an opening for containing the capacitor and a third resin substrate in a multilayer manner while interposing bonding plates, and the capacitor is located immediately below the IC chip,

a conductive pad is formed on the first resin substrate and connected to an electrode of the capacitor, and

a via hole, through which the conductive pad is connected to the conductive circuit on the core substrate, is formed in the first resin substrate.

Claim 2 (Original): A printed circuit board according to claim 1, wherein each of said bonding plates has a core impregnated with a thermosetting resin.

Claim 3 (Original): A printed circuit board according to claim 1, wherein each of said first, second and third resin substrates has a core impregnated with a resin.

Claim 4 (Original): A printed circuit board according to claim 1, wherein a plurality of capacitors are provided.

Claim 5 (Original): A printed circuit board according to claim 1, wherein the conductor circuits are formed on said second resin substrate.

Claim 6 (Amended): A printed circuit board according to claim 1, ~~wherein~~ further comprising:

[[the]] a capacitor ~~[[is]]~~ mounted on a surface of said printed circuit board.

Claim 7 (Amended): A printed circuit board according to claim 6, wherein a capacitance of the capacitor on said surface of said printed circuit board is equal to or higher than a capacitance of ~~a chip~~ the capacitor contained in the core substrate ~~on an inner layer~~.

Claim 8 (Amended): A printed circuit board according to claim 6, wherein an inductance of the capacitor on said surface of said printed circuit board is equal to or higher than an inductance of the ~~chip~~ capacitor contained in the core substrate ~~on an inner layer~~.

Claim 9 (Amended): A printed circuit board according to claim 1, ~~wherein~~ further comprising:

a metal film formed on an electrode of said capacitor.

Claim 10 (Original): A printed circuit board according to claim 9, wherein the metal film formed on the electrode of said capacitor is a plated film mainly consisting of copper.

Claim 11 (Withdrawn): A printed circuit board according to claim 1, wherein at least a part of a coating layer of the electrode of said capacitor is exposed and electrically connected to the electrode exposed from said coating layer.

Claim 12 (Withdrawn): A printed circuit board according to claim 1, wherein a chip capacitor having electrodes formed inside of an outer edge is employed as said capacitor.

Claim 13 (Withdrawn): A printed circuit board according to claim 1, wherein a chip capacitor having electrodes formed in a matrix is employed as said capacitor.

Claim 14 (Withdrawn): A printed circuit board according to claim 1, wherein a plurality of chip capacitors for providing many capacitors are coupled to be employed as said capacitor.

Claim 15 (Amended): A printed circuit board constituted by alternately laminating interlayer resin insulating layers and conductive circuits on a core substrate containing a capacitor, characterized in that

the core substrate containing said capacitor is constituted by providing a first resin substrate, a second resin substrate having an opening for containing the capacitor and a third resin substrate in a multilayer manner while interposing bonding plates, wherein

said first resin substrate and said capacitor are coupled to each other by an insulating bonding agent and the insulating bonding agent is lower in a coefficient of thermal expansion than said first resin substrate,

a conductive pad is formed on the first resin substrate and connected to an electrode of the capacitor, and

a via hole, through which the conductive pad is connected to the conductive circuit on the core substrate, is formed in the first resin substrate.

Claim 16 (Withdrawn): A printed circuit board manufacturing method

(a) forming a conductor pad section on a first resin substrate;

(b) connecting a capacitor to said conductor pad section of said first resin substrate through a conductive bonding agent;

(c) providing a third resin substrate, a second resin substrate having an opening for containing said capacitor and said first resin substrate in a multilayer manner while interposing bonding plates so that said capacitor of said first resin substrate is contained in said opening of said second resin substrate and that said opening of said second resin substrate is closed by the third resin substrate; and

(d) heating and pressurizing said first resin substrate, said second resin substrate and said third resin substrate, to thereby provide a core substrate.

Claim 17 (Withdrawn): A printed circuit board constituted by providing resin insulating layers and conductor circuits on a core substrate in a multilayer manner, wherein said core substrate is constituted by bonding together a plurality of resin substrates, the conductor circuits formed on said plurality of resin substrates; and a capacitor is contained in said core substrate.

Claim 18 (Withdrawn): A printed circuit board constituted by providing resin insulating layers and conductor circuit on a core substrate in a multilayer manner, wherein

said core substrate is constituted by bonding together a plurality of resin substrates, the conductor circuits formed on said plurality of resin substrates; and a capacitor is contained in a concave portion formed in said core substrate.

Claim 19 (Withdrawn): A printed circuit board according to claim 17, wherein said plurality of resin substrates are bonded together by interposing bonding plates.

Claim 20 (Withdrawn): A printed circuit board according to claim 19, wherein each of said bonding plate has a core impregnated with a thermosetting resin.

Claim 21 (Withdrawn): A printed circuit board according to claim 17, wherein each of said resin substrates has a core impregnated with a resin.

Claim 22 (Withdrawn): A printed circuit board according to claim 17, wherein a plurality of said capacitors are provided.

Claim 23 (Withdrawn): A printed circuit board according to claim 17, wherein the capacitor is mounted on a surface of said printed circuit board.

Claim 24 (Withdrawn): A printed circuit board according to claim 23, wherein a capacitance of a chip capacitor on said surface is equal to or higher than a capacitance of a chip capacitor on an inner layer.

Claim 25 (Withdrawn): A printed circuit board according to claim 23, wherein an inductance of a chip capacitor on said surface is equal to or higher than an inductance of the chip capacitor on an inner layer.

Claim 26 (Withdrawn): A printed circuit board according to claim 17, wherein a metal film is formed on an electrode of said capacitor and is electrically connected to the electrode on which said metal film is formed, by plating.

Claim 27 (Withdrawn): A printed circuit board according to claim 26, wherein the metal film formed on the electrode of said capacitor is a plated film mainly consisting of copper.

Claim 28 (Withdrawn): A printed circuit board according to claim 17, wherein at least a part of a coating layer of the electrode of said capacitor is exposed and electrically connected to the electrode exposed from said coating layer.

Claim 29 (Withdrawn): A printed circuit board according to claim 17, wherein a chip capacitor having electrodes formed inside of an outer edge is employed as said capacitor.

Claim 30 (Withdrawn): A printed circuit board according to claim 17, wherein a chip capacitor having electrodes formed in a matrix is employed as said capacitor.

Claim 31 (Withdrawn): A printed circuit board according to claim 17, wherein a plurality of chip capacitors for providing many capacitors are coupled to be employed as said capacitor.

Claim 32 (Withdrawn): A printed circuit board according to claim 17, wherein the capacitor is coupled to said core substrate by an insulating bonding agent and the insulating bonding agent is lower in a coefficient of thermal expansion than said core substrate.

Claim 33 (Withdrawn): A printed circuit board manufacturing method, characterized by comprising at least the following steps (a) to (e):

- (a) forming conductor circuits on a plurality of resin substrates;
 - (b) providing a plurality of said resin substrates in a multilayer manner through bonding plates;
 - (c) bonding together said resin substrates through said bonding plates, to thereby provide a core substrate;
 - (d) forming a concave portion in said core substrate;
- and
- (e) containing a capacitor in said concave portion.

Claim 34 (Withdrawn): A printed circuit board manufacturing method characterized by comprising at least the following steps (a) to (e)

- (a) forming a resin substrate with a through hole and having a conductor circuit provided on a surface;
- (b) forming a resin substrate without a through hole and having a conductor circuit provided on a surface;
- (c) providing said resin substrate with the through hole and said resin substrate without the through hole through a bonding plate in a multilayer manner;
- (d) bonding together said resin substrates through said bonding plate, to thereby provide a core substrate; and

(e) containing a capacitor in said concave portion.

Claim 35 (Withdrawn): A printed circuit board constituted by alternately providing interlayer resin insulating layers and conductor circuits in a multilayer manner on a core substrate containing a capacitor, wherein

the core substrate containing said capacitor is constituted by providing a first resin substrate, a second resin substrate having an opening for containing the capacitor and a third resin substrate in a multilayer manner while interposing bonding plates; and

via holes connected to a terminal of said capacitor are provided on both sides of said core substrate.

Claim 36 (Withdrawn): A printed circuit board according to claim 35, wherein each of said bonding plates has a core impregnated with a thermosetting resin.

Claim 37 (Withdrawn): A printed circuit board according to claim 35, wherein each of said first, second and third resin substrates has a core impregnated with a resin.

Claim 38 (Withdrawn): A printed circuit board according to claim 35, wherein a plurality of said capacitors are provided.

Claim 39 (Withdrawn): A printed circuit board according to claim 35, wherein the conductor circuits are formed on said second resin substrate.

Claim 40 (Withdrawn): A printed circuit board according to claim 35, wherein the capacitor is mounted on a surface of said printed circuit board.

Claim 41 (Withdrawn): A printed circuit board according to claim 40, wherein a capacitance of a chip capacitor on said surface is equal to or higher than a capacitance of a chip capacitor on an inner layer.

Claim 42 (Withdrawn): A printed circuit board according to claim 40, wherein an inductance of a chip capacitor on said surface is equal to or higher than an inductance of the chip capacitor on an inner layer.

Claim 43 (Withdrawn): A printed circuit board according to claim 35, wherein a metal film is formed on an electrode of said capacitor and is electrically connected to the electrode on which said metal film is formed, by plating.

Claim 44 (Withdrawn): A printed circuit board according to claim 43, wherein the metal film formed on the electrode of said capacitor is a plated film mainly consisting of copper.

Claim 45 (Withdrawn): A printed circuit board according to claim 35, wherein at least a part of a coating layer of the electrode of said capacitor is exposed and electrically connected to the electrode exposed from said coating layer.

Claim 46 (Withdrawn): A printed circuit board according to claim 35, wherein a chip capacitor having electrodes formed inside of an outer edge is employed as said capacitor.

Claim 47 (Withdrawn): A printed circuit board according to claim 35, wherein a chip capacitor having electrodes formed in a matrix is employed as said capacitor.

Claim 48 (Withdrawn): A printed circuit board according to claim 35, wherein a plurality of chip capacitors for providing many capacitors are coupled to be employed as said capacitor.

Claim 49 (Withdrawn): A printed circuit board according to claim 35, wherein said first resin substrate and said capacitor are coupled to each other by an insulating bonding agent and the insulating bonding agent is lower in a coefficient of thermal expansion than said first resin substrate.

Claim 50 (Withdrawn): A printed circuit board manufacturing method characterized by comprising at least the following steps (a) to (d)

- (a) attaching a capacitor to a first resin substrate through a bonding material;
- (b) providing a third resin substrate, a second resin substrate having an opening for containing said capacitor and a first resin substrate in a multilayer manner so that said capacitor of said first resin substrate is contained in said opening of said second substrate and that said opening of said second resin substrate is closed by said third resin substrate, thereby providing a core substrate;
- (c) applying laser and forming a via hole opening reaching said capacitor in said core substrate;
- (d) forming a via hole in said via hole opening.

Claim 51 (Withdrawn): A printed circuit board manufacturing method characterized by comprising at least the following steps (a) to (f)

- (a) forming a via hole formation opening in a metal film on one side of a first resin substrate;

(b) attaching a capacitor to a metal film unformed surface of said first resin substrate through a bonding material;

(c) providing a third resin substrate, a second resin substrate having an opening for containing said capacitor and said first resin substrate in a multilayer manner by interposing bonding plates so that said capacitor of said first resin substrate is contained in said opening of said second resin substrate and that said opening of said second resin substrate is closed by said third resin substrate;

(d) heating and pressurizing said first resin substrate, said second resin substrate and said third resin substrate, to thereby provide a core substrate;

(e) applying laser to said via hole formation opening formed in said metal film of said first resin substrate, and forming a via hole opening reaching said capacitor; and

(f) forming a via hole in said via hole opening

Claim 52 (Withdrawn): A printed circuit board manufacturing method characterized by comprising at least the following steps (a) to (f)

(a) forming via hole formation openings in metal films of a first resin substrate and a third resin substrate, the metal films bonded on one sides of said first resin substrate and said third resin substrate, respectively;

(b) attaching a capacitor to a metal film unformed surface of said first resin substrate through a bonding material;

(c) providing said third resin substrate, a second resin substrate having an opening for containing said capacitor and said first resin substrate in a multilayer manner by providing a bonding plate on said metal film unformed surface so that said capacitor of said first resin substrate is contained in said opening of said second resin substrate and that said opening of said second resin substrate is closed by said third resin substrate;

(d) heating and pressurizing said first resin substrate, said second resin substrate and said third resin substrate, to thereby provide a core substrate;

(e) applying laser to said via hole formation openings formed in said first resin substrate and said third resin substrate, and forming a via hole opening reaching said capacitor; and

(f) forming a via hole in said via hole opening.

Claim 53 (Withdrawn): A printed circuit board manufacturing method characterized by comprising at least the following steps (a) to (g)

(a) forming a through hole formation openings in metal films of a first resin substrate and a third resin substrate, the metal films bonded on one sides of said first resin substrate and said third resin substrate, respectively;

(b) attaching a capacitor to a metal film unformed surface of said first resin substrate through a bonding material;

(c) providing said third resin substrate, a second resin substrate having an opening for containing said capacitor and said first resin substrate in a multilayer manner by providing a bonding plate on said metal film unformed surface so that said capacitor of said first resin substrate is contained in said opening of said second resin substrate and that said opening of said second resin substrate is closed by said third resin substrate;

(d) heating and pressurizing said first resin substrate, said second resin substrate and said third resin substrate, to thereby provide a core substrate;

(e) applying laser to said through hole formation openings formed in said first resin substrate and said third resin substrate, and forming a via hole opening reaching said capacitor;

(f) removing or thinning said metal films; and

(g) forming a conductor circuit and a via hole on said core substrate.

Claim 54 (Withdrawn): A printed circuit board constituted by providing resin insulating layers and conductor circuits on a core substrate in a multilayer manner, wherein a capacitor is included in said core substrate, and a relatively large lower-layer via hole connected to an electrode of said capacitor is formed; and

a plurality of relatively small upper-layer via holes connected to one said lower-layer via hole are provided in an interlayer resin insulating layer on an upper surface of said core substrate.

Claim 55 (Withdrawn): A printed circuit board according to claim 54, wherein said lower-layer via hole is a filled via hole filled with an plated material and having a flat surface.

Claim 56 (Withdrawn): A printed circuit board according to claim 54, wherein said lower-layer via hole is a filled via hole having a resin filled inside and a metal film formed on a surface.

Claim 57 (Withdrawn): A printed circuit board according to claim 54, wherein said capacitor is singularly contained in a concave portion formed in said core substrate.

Claim 58 (Withdrawn): A printed circuit board according to claim 54, wherein a plurality of said capacitors are contained in a concave portion formed in said core substrate.

Claim 59 (Withdrawn): A printed circuit board according to claim 54, wherein a metal film is formed on an electrode of said capacitor and electrically connected to the electrode on which said metal film is formed, by plating.

Claim 60 (Withdrawn): A printed circuit board according to claim 59, wherein the metal film formed on the electrode of said chip capacitor is a plated film mainly consisting of copper.

Claim 61 (Withdrawn): A printed circuit board according to claim 54, wherein at least a part of a coating layer of the electrode of said capacitor is exposed and electrically connected to the electrode exposed from said coating layer.

Claim 62 (Withdrawn): A printed circuit board according to claim 54, wherein a chip capacitor having electrodes formed inside of an outer edge is employed as said capacitor.

Claim 63 (Withdrawn): A printed circuit board according to claim 54, wherein a chip capacitor having electrodes formed in a matrix is employed as said capacitor.

Claim 64 (Withdrawn): A printed circuit board according to claim 54, wherein a plurality of chip capacitors for providing many capacitors are coupled to be employed as said capacitor.

Claim 65 (Withdrawn): A printed circuit board according to claim 54, wherein a resin lower in a coefficient of thermal expansion, than the core substrate, is filled between said core substrate and the capacitor.

Claim 66 (Withdrawn): A printed circuit board manufacturing method characterized by comprising at least the following steps (a) to (e):

(a) embedding a capacitor in a core substrate;

- (b) forming a resin insulating layer on an upper surface of said capacitor;
- (c) forming a relatively large lower-layer via hole connected to an electrode of said capacitor, in said resin insulating layer;
- (d) forming an interlayer resin insulating layer on an upper surface of said core substrate; and
- (e) providing a plurality of relatively small upper-layer via holes connected to one said lower-layer via hole, in said interlayer resin insulating layer.

Claim 67 (Withdrawn): A printed circuit board manufacturing method according to claim 66, further comprising, before step (a), a step of forming a concave portion in said core substrate and containing said capacitor in said concave portion.

Claim 68 (Withdrawn): A printed circuit board manufacturing method according to claim 66, further comprising, before step (a), a step of forming a concave portion in said core substrate and containing a plurality of said capacitors in said concave portion.

Claim 69 (Withdrawn): A printed circuit board manufacturing method according to claim 66, further comprising, before step (a), a step of forming a through hole in a resin plate, and bonding a resin plate to said resin plate on which said through hole is formed, to thereby form a core substrate having a concave portion.

Claim 70 (Withdrawn): A printed circuit board manufacturing method according to claim 66, wherein a filled via hole filled with a plated material and having a flat surface is formed when forming said lower-layer via hole.

Claim 71 (Withdrawn): A printed circuit board manufacturing method according to claim 66, wherein a filled via hole formed by filling a resin inside and then providing a metal film on a surface, is formed when forming said lower-layer via hole.

Claim 72 (Withdrawn): A printed circuit board manufacturing method according to claim 68, further comprising, after step (a), a step of applying a pressure to upper surfaces of said plurality of capacitors within said concave portion from above, and making heights of the upper surfaces of said capacitors uniform.

Claim 73 (New): A printed circuit board according to claim 1, wherein
the IC chip is connected to the electrode of the capacitor via the conductive circuit,
the via hole, and the conductive pad, and
the via hole is formed immediately below the IC chip.

Claim 74 (New): A printed circuit board according to claim 15, wherein
the IC chip is connected to the electrode of the capacitor via the conductive circuit,
the via hole, and the conductive pad, and
the via hole is formed immediately below the IC chip.

Claim 75 (New): A printed circuit board comprising:
a core substrate comprising a first resin substrate, a second resin substrate having an opening and a third resin substrate in a multilayer manner while interposing bonding plates;
insulating layers and conductive circuit layers alternately laminated on the core substrate;

an IC chip mounted on an outer layer of the insulating layers and the conductive circuit layers; and

a capacitor formed in the opening of the second resin substrate and located immediately below the IC chip; wherein

the IC chip is connected to an electrode of the capacitor through a via hole formed in the core substrate immediately below the IC chip.

Claim 76 (New): A printed circuit board according to claim 75, further comprising:
a chip capacitor mounted on the outer layer of the insulating layers and the conductive circuit layers.

Claim 77 (New): A printed circuit board according to claim 76, wherein
a capacitance of the chip capacitor is equal to or higher than a capacitance of the capacitor formed in the opening of the second resin substrate.

Claim 78 (New): A printed circuit board according to claim 76, wherein
an inductance of the chip capacitor is equal to or higher than an inductance of the capacitor formed in the opening of the second resin substrate.

Claim 79 (New): A printed circuit board according to claim 75, further comprising:
a metal film formed on the electrode of the capacitor.

Claim 80 (New): A printed circuit board according to claim 79, wherein

Application No. 10/780,856
Reply to Office Action of August 9, 2005

the metal film formed on the electrode of the capacitor is a plated film mainly consisting of copper.